CLAIMS

What is claimed is:

1. A process for the preparation of a coating, a coated substrate, an adhesive, film or sheet, the process comprising:

- preparing a coating mixture containing a reactive system;
- applying the coating mixture onto a substrate resulting in a substrate coated with the coating mixture; and
- reacting the reactive system; and wherein
- the coating mixture is prepared as a mixture comprising a first and a second reactive system, and after the application of the coating mixture the first reactive system is substantially reacted under conditions where the second reactive system is substantially not reacted;
- after substantially reacting the first reactive system at elevated temperatures the coating substrate is remoulded, resulting in a remoulded coating; and
- the second reactive system is substantially reacted during or after the remoulding of the coated substrate, resulting in a fixed remoulded coating whereby the first reactive system and the second reactive system are essentially reacted as a sequential two-step reaction.

2. The process according to claim 1, wherein the coating mixture is prepared such that one reactive system from the first and the second reactive system comprises i) a compound with at least one isocyanate functionality, and ii) a compound with at least one reactive hydrogen, and the selected reactive system is non-reactive or hardly reactive at room temperature.

3. The process according to claim 2, wherein the compound containing reactive hydrogen is a polyhydrazide- and/or polysemicarbazide-functional compound and/or carbodihydrazide.

4. The process according to claim 3, wherein the compound containing reactive hydrogen is present in the mixture at ambient temperature as a fine powder or as a dispersion in a material which is non-reactive towards the reactive hydrogen.

5. The process according to claim 2, wherein the other reactive system comprises on one hand a ketone, anhydride, epoxide, a polyisocyanate with a different reactivity, a blocked isocyanate and/or a cyclic carbonate function, or the isocyanate functional compound from claim 2 and on the other hand a hydrazide or semicarbazide with a lower reactivity or with a different particle size, an amine, hindered amine, chlorinated amine, a polymer protected amine, blocked amine, azetidine, aspartate, carboxyl, aromatic amine, hydroxide and/or melamine function and/or that the other reactive system comprises polyalkylsilozane or melamine functions which are polymerisable by self-condensation, and/or that the other reactive system comprises an unsaturated compound which undergoes an addition polymerization.

6. The process according to claim 5, wherein the compound containing at least one isocyanate functionality also contains another functional group according to claim 5 which is not reactive towards the isocyanate function.

7. The process according to claim 5, wherein the compound containing the isocyanate functionality also contains another functionality according to claim 5, which is reactive with the compound with at least one reactive hydrogen.

8. The process according to claim 5, wherein the dispersion with the polyhydrazide- and/or polysemicarbazide-functional compound and/or carbodihydrazide also contains another functional group according to claim 5 which is not reactive with the polyhydrazide- and/or polysemicarbazide-functional compound and/or carbodihydrazide.

9. The process according to claim 2, wherein the compound containing at least one isocyanate functionality contains an acid function.

10. The process according to claim 1, wherein after the application of the coating mixture onto a substrate to provide a substrate coated with the coating mixture, the coated substrate is treated at an elevated temperature between 50 to 200°C to effect the first reaction step in which the first reactive system substantially reacts and the second reactive system is only slightly or not reacted.

11. The process according to claim 2, wherein the compound containing at least one isocyanate functionality and the reactive hydrogen-functional compound are mixed together, whereafter the obtained mixture is applied onto a substrate and the thus obtained coated or impregnated substrate is heated in a first reaction step to a temperature of 50 to 200°C for 0.5 to 10 minutes, whereafter the formed intermediate material is treated in a second step by:

- embossing or remoulding, followed by heating to a temperature from 10 to 100°C above that of the first reaction step, or

- heating to a temperature from 10 to 100°C above that of the first reaction step, under which conditions the intermediate material melts or softens, followed by embossing and/or remoulding of the material, or

- applying of a second substrate onto the intermediate material, followed by, whether or not under pressure, lamination of the second substrate in the intermediate coating at a temperature between 10 and 100°C above that of the first reaction step, under which conditions the intermediate material further cures, followed by elimination of the first substrate, or

- embossing and/or remoulding, followed by curing after radical or UV-initiation, or

- welding or applying as sealing to other materials or to the same material at a temperature between 10 and 100°C above that of the first reaction step.

12. The process according to claim 2, wherein a stoichimetric ratio of a total amount of isocyanate-, ketone-, epoxide-, anhydride- or cyclic carbonate- functional compounds to polyhudrazide and/or semicarbazide functional compound, carbodihydrazide, hydrazide- or semicarbazide-functional compound with a lower reactivity or with different particle size, amine, hindered amine, chlorinated amine, an amine protected by a polymer, blocked amine, azetidine, aspartate, carboxyl, aromatic amine, hydroxide, and/or melamine is between 3:1 and 1:3.

13. The process according to claim 2, wherein a ratio of isocyanate groups to ketone-, epoxide-, anhydride, melamine-, siloxane-, unsaturated and/or cyclic carbonate-functional groups is between 20:1 and 1:20.

14. The process according to claim 2, wherein the compound with at least one isocyanate functionality is a polyisocyanate.

15. The process according to claim 9, wherein the acid function is a carboxylic acid function.

16. The process according to claim 11, wherein the obtained mixture further comprises the other reactive system and/or a catalyst.

17. The process according to claim 11, wherein the embossing and/or remoulding step followed by curing is at elevated temperatures of between 10 and 100°C above that of the first reaction step.

18. The process according to claim 12, wherein the stoichiometric ratio is between 1.5:1 and 1:1.5.

19. The process according to claim 13, wherein the ratio is between 10:1 and 1:10.

20. Cured product obtained by a process according to claim 1.